

REMARKS

The following is responsive to the Patent Office Action mailed September 21, 2004. In this Action, claims 15, 18, 22 and 23 were rejected as anticipated by U.S. Patent No. 5,775,598 of *Takayama, et al.* under 35 U.S.C. § 102(b). Claim 21 was rejected as obvious from the disclosure of the *Takayama, et al.* patent under 35 U.S.C. § 103(a). Claims 4, 5, 16, 17, 19, 20 and 24 were rejected as unpatentable over the *Takayama, et al.* patent in view of the teaching of U.S. Patent No. 4,872,616 of *Behr, et al.* Although the Applicant respectfully traverses this rejection of the claims, the rejected claims have been cancelled and new claims 25 to 37 have been substituted for the rejected claims. The Applicant respectfully submits that new claims 25 to 37 clearly patentably distinguish over the prior art cited by the Examiner for the reasons set forth below.

The *Takayama, et al.* patent discloses an atomizer for coating workpieces including a conventional cone-shaped spray head or atomizing head (5) rotatably supported by the body (1) and six *external electrodes* (11) spaced from the cover (3). *Contrary to the finding* by the Examiner, the element (25) is *not an electrode* connected to a high voltage supply. Instead, the element (25) is referred to in the specification of the *Takayama, et al.* patent as a "repulsion electrode" at *ground potential*. The *Takayama, et al.* patent is attempting to solve one of the problems solved by the atomizer of this invention which is to reduce accumulation or deposition of paint overspray on the external electrodes (11). (See col. 7, lines 49 to 54). The *Takayama, et al.* patent proposes to solve this problem by including an inner conductive ring (22, 34, 44 and 45, 22', etc.) having a fore end (22b) which closely surrounds the circumferential surface (5A) of the atomizing head (5) which is "connected to the ground through the air motor 2, forming an annular repulsion electrode 25 at its fore end 22B." Thus, "the annular repulsion electrode 25 of the shaping ring 21 and the rotary atomizing head 5 remain at the same potential (at the earth potential)." (Col. 7, lines 23 to 33). The *Takayama, et*

al patent then claims that "paint particles which have been released from the paint releasing edge 5C of the rotary atomizing head 5 and negatively charged by the high voltage external electrodes 11, are securely kept from depositing on the shaping air ring 21 by homopolar repulsions occurring between negatively charged paint particles and the clouds of negative ions." (Col. 7, lines 49 to 54). Thus, the "repulsion electrode" (25) is *not negatively electrically charged* or "connected to a high voltage supply" as set forth in claims 25 and 32 of this application, but is at *ground potential*. This is directly contrary to the teaching of this application as discussed further below.

The *Behr, et al* patent assigned to a sister corporation of the assignee of this application merely discloses an external charging ring similar to, but not identical to the charging ring having external electrodes (11) disclosed in the *Takayama, et al* patent.

As set forth in the specification of this application, such external charging rings have several disadvantages, namely (1) "they limit the motion and operation possibilities for coating systems with painting robots due to their bulky outer shape," (paragraph [0003], page 2), (2) "the electrode tips arrange far outside the spray head in the radial direction tend to become contaminated, particularly through self coating," ([0004]) and (3) "because the contamination has a negative effect on the electric field, which has the result of reducing the application efficiency and consequently much stronger self coating." (Paragraph [0004]). These problems are solved by the atomizer of this invention by a "ring part" formed of an insulating material surrounding the housing in engagement with the housing thereby preventing overspray from being received between the ring part, and the ring part has a generally radial end portion and an electrode arrangement which is embedded in the ring part having an end extending through the radial end of the ring part concentric with the spray head and spaced rearwardly from the end portion of the housing, such that the spray head externally charges the coating material sprayed by the spray head by ionization of air surrounding the housing. In a preferred embodiment, the

electrode arrangement comprises a plurality of needle-shaped electrodes equally circumferentially spaced and embedded in the ring part having a tip portion extending through the radial end portion of the ring part. In a more preferred embodiment, the tip portions of the electrodes are substantially flush with the radial end portion of the ring part and wherein the outer diameter of the "electrode arrangement" or equally circumferentially spaced electrodes is less than twice an outer diameter of the cone-shaped spray head. This arrangement of an atomizer for electrostatic coating of workpieces is not disclosed or suggested in the prior art and is in fact contrary to the teaching of the prior art. As also stated in the specification of this application (paragraph [0008]): "Surprisingly, the tendency of the spraying towards self-coating of electrode tips is reduced by the invention and consequently the application efficiency and also the useable operation period of the atomizer is improved."

Claim 25 now specifically recites that the atomizer includes an outer housing formed of an insulating material including a longitudinal axis, an end portion and an axial tube extending through the end portion receiving conductive coating, a cone-shaped spray head rotatably supported by the housing opposite the tube, a ring part formed of an insulating material "surrounding said housing in engagement with said housing preventing overspray from being received between said ring part and said housing having a radial end portion spaced *rearwardly* from said end portion of said housing," and an "electrode arrangement *embedded in said ring part connected to a high voltage supply* having an end extending through said generally radial end portion of said ring part concentric with said spray head and *spaced rearwardly from said end portion of said housing* and said spray head" externally charging conductive coating material sprayed by the spray head by ionization of air surrounding the housing. The Applicant respectfully submits that the atomizer now defined in new claim 25 is not disclosed or suggested in the prior art, particularly including the *Takayama, et al.* and *Behr, et al.* patents which disclose atomizers having external electrodes directly contrary to the teaching of claim 25.

Independent claim 32 and claim 26, which is dependent upon claim 25, more specifically recite that the electrode arrangement comprises a plurality of needle-shaped electrodes equally circumferentially spaced embedded in the ring part each having a tip portion extending through the generally radial end portion of the ring part. Again, this is directly contrary to the teaching of the *Takayama, et al.* and *Behr, et al.* patents and solves the problems associated with external electrodes as set forth above. Further, as will be understood, assuming that the "repulsion electrode" (25) disclosed in the *Takayama, et al.* patent does in fact limit or eliminate collection or deposition of paint overspray on the external electrodes (11), it does not solve the disadvantage of external electrodes which "limit the motion and operation possibilities for coating systems with painting robots due to their bulky outer shape" as set forth above.

Claim 27, which is dependent upon claim 26, and claim 33, which is dependent upon claim 27, further define the tip portion of the electrodes which are "substantially flush with said radial end portion of said ring part." None of the prior art references disclose or suggest this arrangement which further reduces accumulation of overspray on the electrodes. Claim 28, which is dependent upon claim 26 and claim 34, which is dependent upon claim 32, further recites that the electrodes are "connected to a common annular conductor" which is located within the housing. In both the *Takayama, et al.* and *Behr, et al.* patents, the external ring conductor is located outside the housing. Claim 29, which is dependent upon claim 25, and claim 35, which is dependent upon claim 29, recite that the ring part forms an outer wall of the housing as shown, for example, at 8' in Figure 5. Claim 31, which is dependent upon claim 25, and claim 37, which is dependent upon claim 32, further recite that the electrode arrangement (claim 31) or the plurality of circumferentially spaced needle-shaped electrodes (claim 37) "has an outer diameter less than twice an outer diameter of said cone-shaped spray head." As set forth in the specification of this application, it is believed that this arrangement results in improved efficiency of the atomizer and is not disclosed or suggested in the prior art.

Finally, claim 30, which is dependent upon claim 25, and claim 36, which is dependent upon claim 32, recite that the atomizer as shown in Figure 5 includes a second electrode arrangement (claim 30) or a second plurality of equally circumferentially spaced needle-shaped electrodes (claim 36) which are embedded in the housing including a tip extending through a generally radial portion of the housing "spaced rearwardly of said end portion" of the housing. As set forth above, the *Takayama, et al.* patent does not disclose two sets of negatively charged electrodes, but discloses an external electrode arrangement (11) and a "repulsion electrode" (25) *which is at ground potential*. Thus, neither of the references disclose two sets of electrodes as specifically recited in claims 30 and 36.

For the reasons set forth above, the Applicant respectfully submits that new claims 25 to 37 patentably distinguish over the prior art and allowance of these claims is respectfully requested.

Although it is believed that no fee is due for the filing of this Amendment, the Commissioner is authorized to charge our Deposit Account No. 08-2789 for any additional fees or credit the account for any overpayments regarding this Amendment. Further and favorable reconsideration of the outstanding Office Action is hereby requested.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the attached Amendment is being facsimile transmitted to Examiner Laura Estelle Edwards at the U.S. Patent and Trademark Office at facsimile number (703) 872-9306 on this 10th day of December, 2004.

Tracy L. Smith
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